

CARPA Air Emergency Response Toxic Gas Analyzer Workshop

Featuring On-Site GC/MS Analysis

South Coast Air Quality Management District

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South Coast Air Quality Management District

The South Coast Air Quality Management District includes all of Orange County and portions of Los Angeles, San Bernardino and Riverside Counties, an area of 10,743 square miles with 16.5 million people and 13 million vehicles.



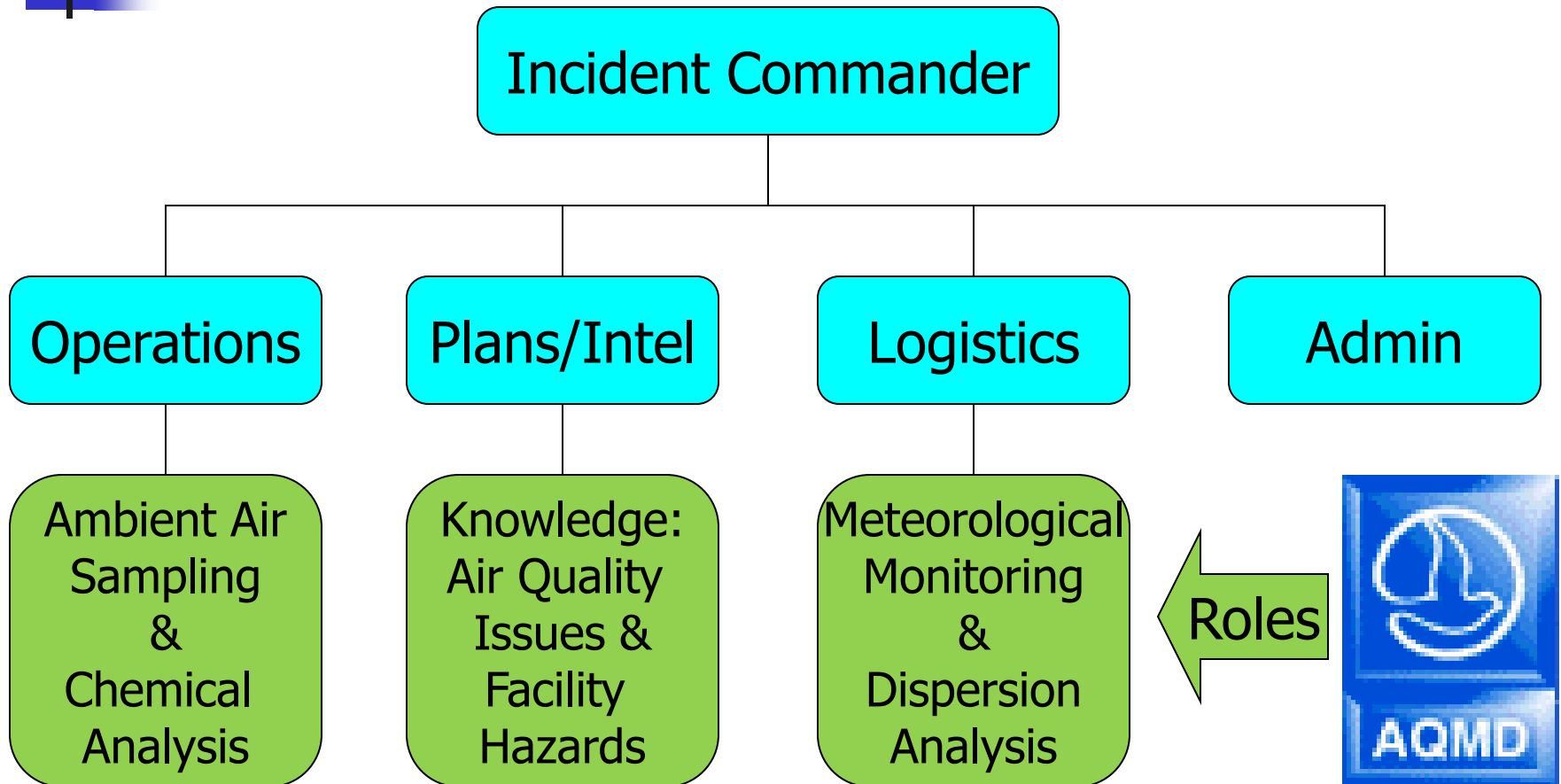
Role of SCAQMD in ER

- SCAQMD is an Emergency Response Agency
- Provides Specialized Support within the Incident Command System (ICS)





Incident Command System





AQMD ER ON-SCENE STAFF

- On-Scene Coordinator
- Inspector
- Chemists
- Instrument Technicians



Compliance Supervisor

- On-Scene Coordinator
 - Point of Contact for other Agencies
 - Provides Communication with Incident Commander (IC), including SCAQMD Measurement Results
 - Incident Commander for SCAQMD Staff
 - Able to Take Preliminary Samples (Canister and Tedlar[®] Bag)



Air Quality Inspector

- Supports the On-Scene Coordinator
- Follows up after the Incident



Air Quality Chemist

- Laboratory

- Performs Analyses of Samples Delivered to the Laboratory
- Generates Data and Reports for Review by the Laboratory Manager

- Field

- Provides Expertise on Sampling and Analyses using Portable Instrumentation and Equipment



Incident Response Time

- Initial Phone Contact with Compliance Supervisor. 1-800-CUT-SMOG
- Call back within 5 Minutes
- Equipment and Personnel -
Level/Type/Location of Response

Sampling Overview

- **#1 Rule: Safety**
- Sampling Protocol
 - Level 1 Training – Our activities are limited by our training
 - Seek help from, and provide guidance to, Haz Mat experts



Sampling Overview

■ Sampling Equipment Available

- Containers for Non Gaseous Samples
- Tedlar® Bags/ Lung Sampler
- Canisters
- Portable GC/MS
- Jerome®
- Dräger® CMS

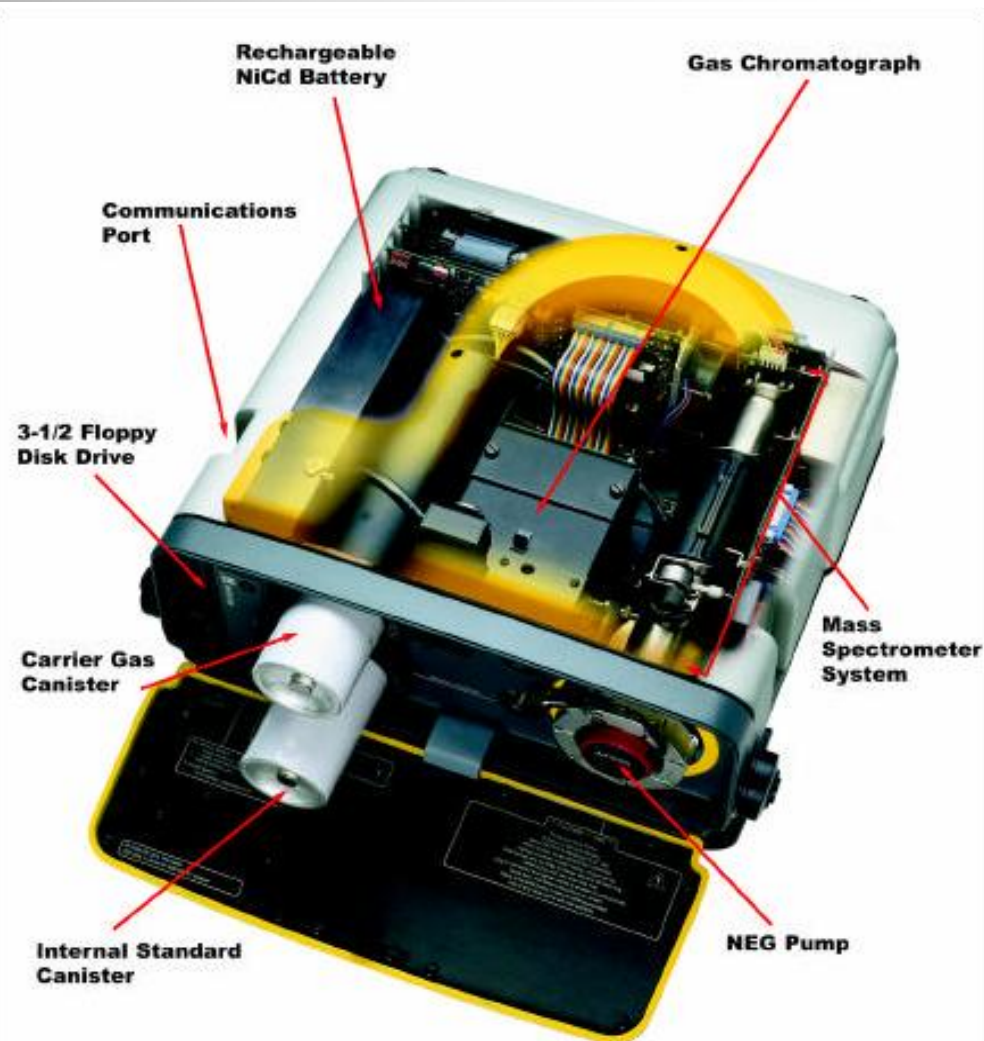


Portable GC/MS



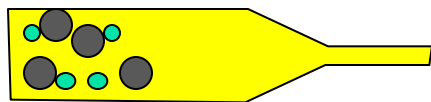
HAPSITE[®] GC/MS Components

- Sample Probe and Pump
- Gas Chromatograph
- Mass Spectrometer
- Computer and Software

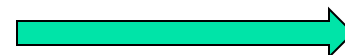
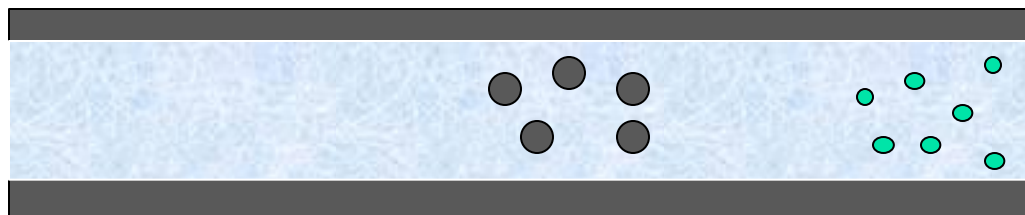
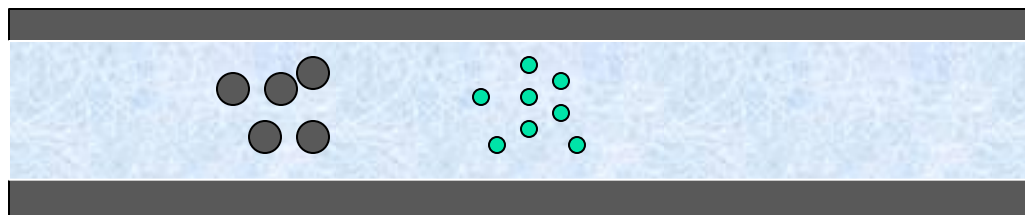
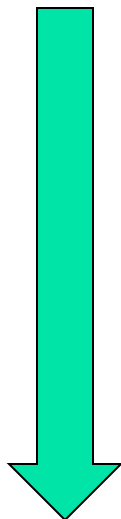




Gas Chromatography (GC)



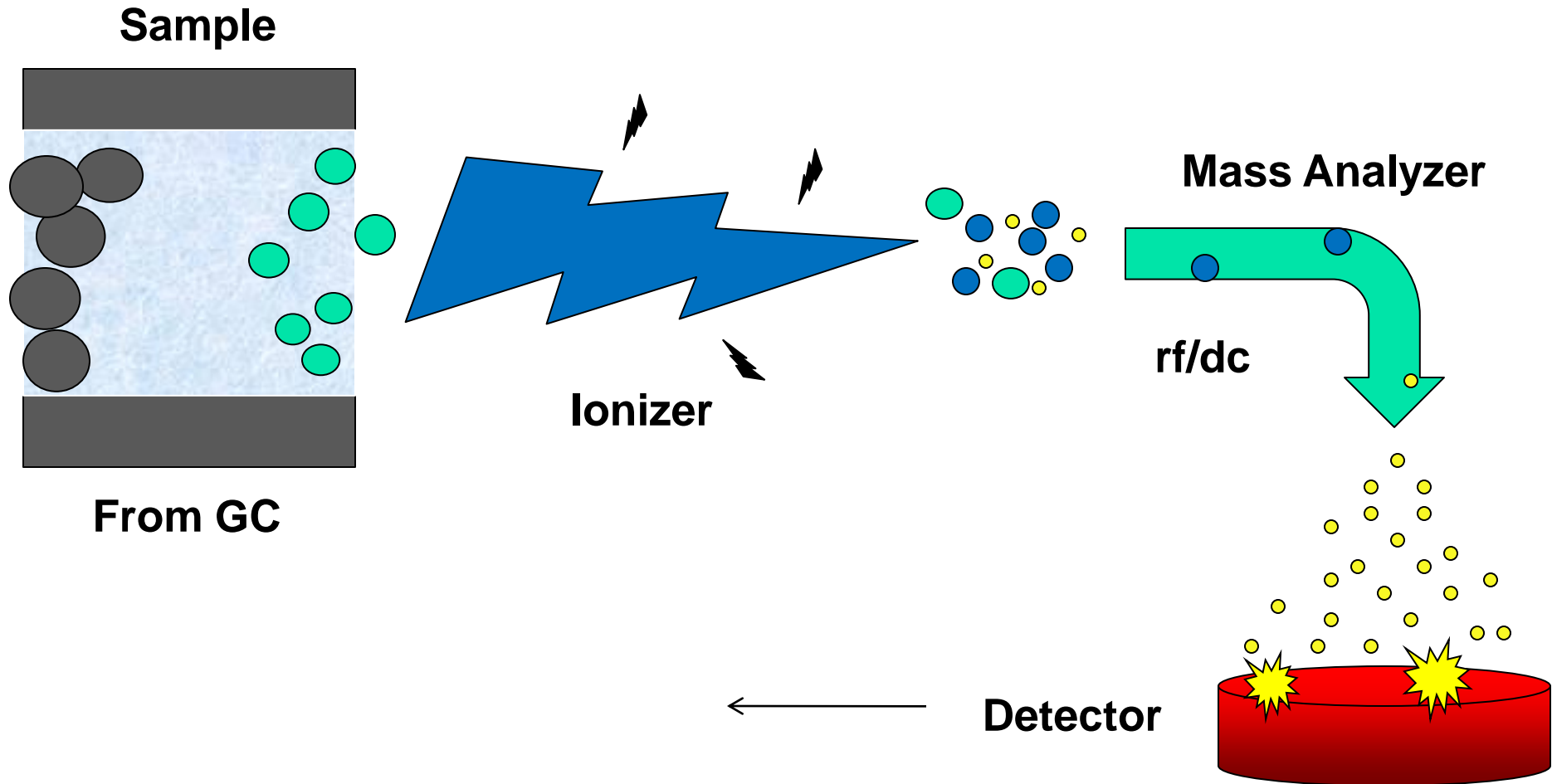
Time
15
Minutes



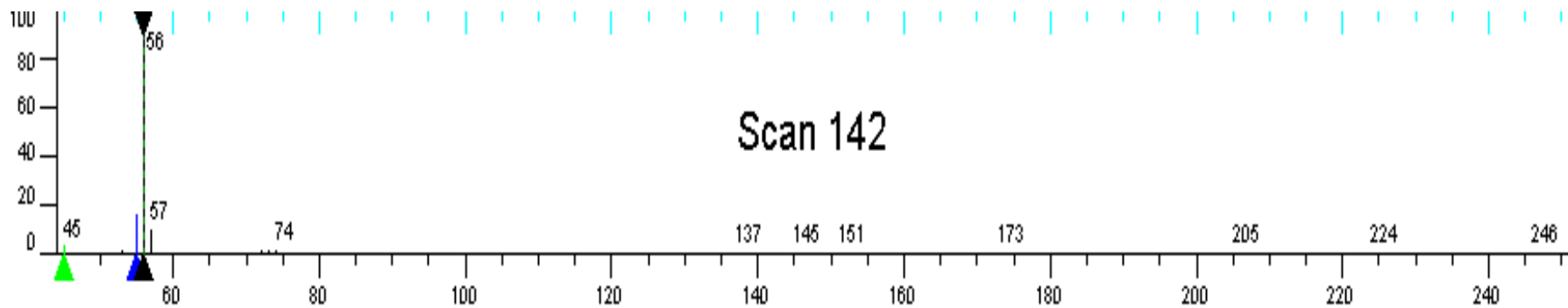
To MS



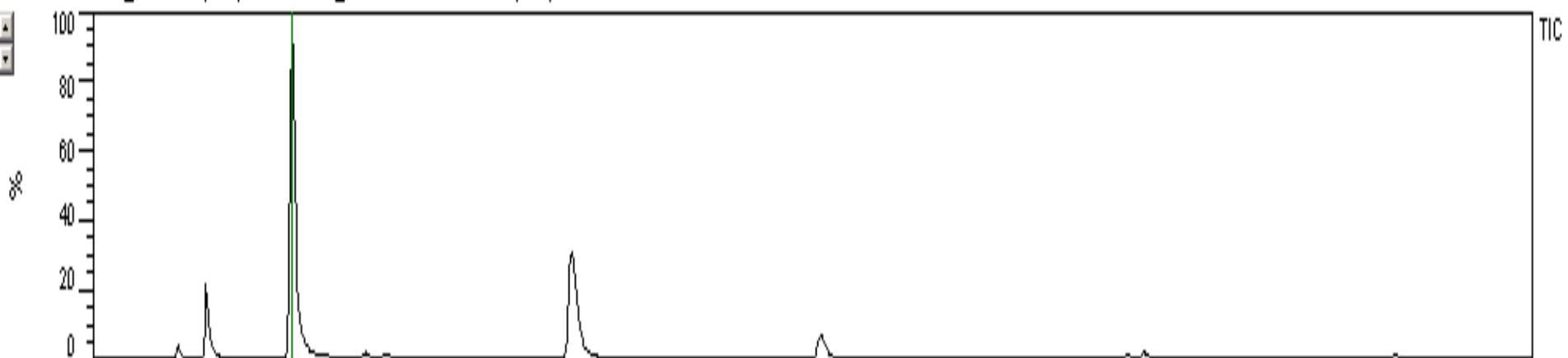
Mass Spectrophotometer (MS)



Ion Chromatogram



TIC_Max = 81,156,192 : TIC/TIC_Max = 100% : TIC = 81,156,192 : Scan Set #1 : Scan # 142 : RT = 02:43.8



Scan- Library Search

On Spectrum Scan 1...

NIST Hit #1:

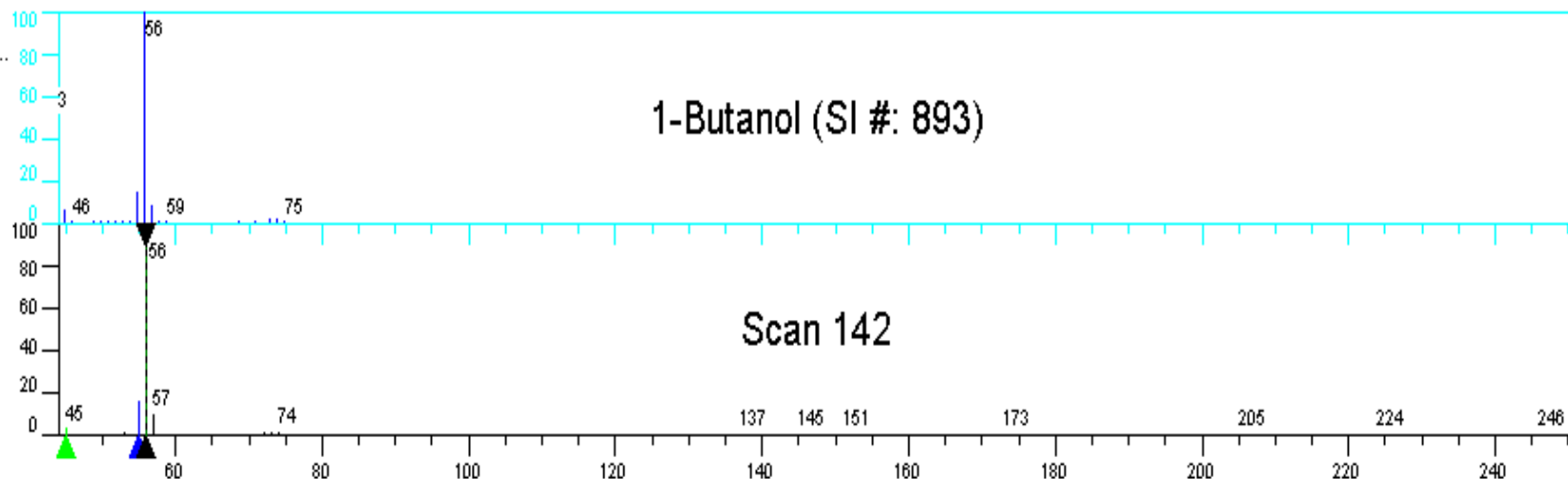
SI #: 893

Formula: C₄H₁₀O

CAS #: 71363

Normalization:

56 : 58,233,076



Portability Features

- Completely Self-Contained Gas Chromatograph/ Mass Spectrometer (GCMS)
- Rugged for Field Deployment
- Built for Easy Decontamination and Cleaning



Field Friendly Features

- Completely Self-Contained Gas Chromatograph/ Mass Spectrometer (GCMS) Instrument Has On-Board Battery, Carrier Gas and Internal Standard
- About 40 Pounds
- Instrument can go on a Backpack for Remote Use



Advantages – On Site Analysis

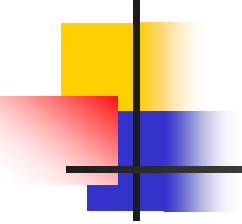
- Reduce Time Frame for Reportable Results
- Ability to Take Many Measurements
- Modify Sampling Strategy



Advantages – Ease of Use

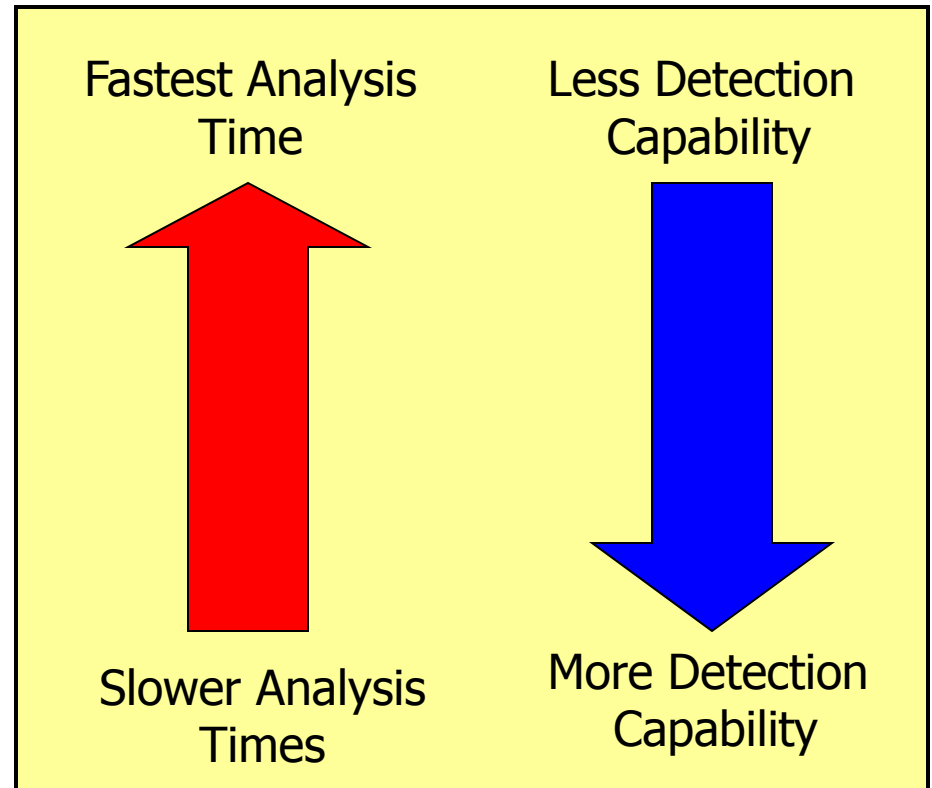
- One Touch Sampling
- Multiple Options for Operation
 - Probe
 - Front Panel
 - Laptop-wireless
- On Board Display
- Automatic GPS and Time Stamp





Advantages - Versatility

- Survey Mode
- Loop Injector Mode
- Trap Mode



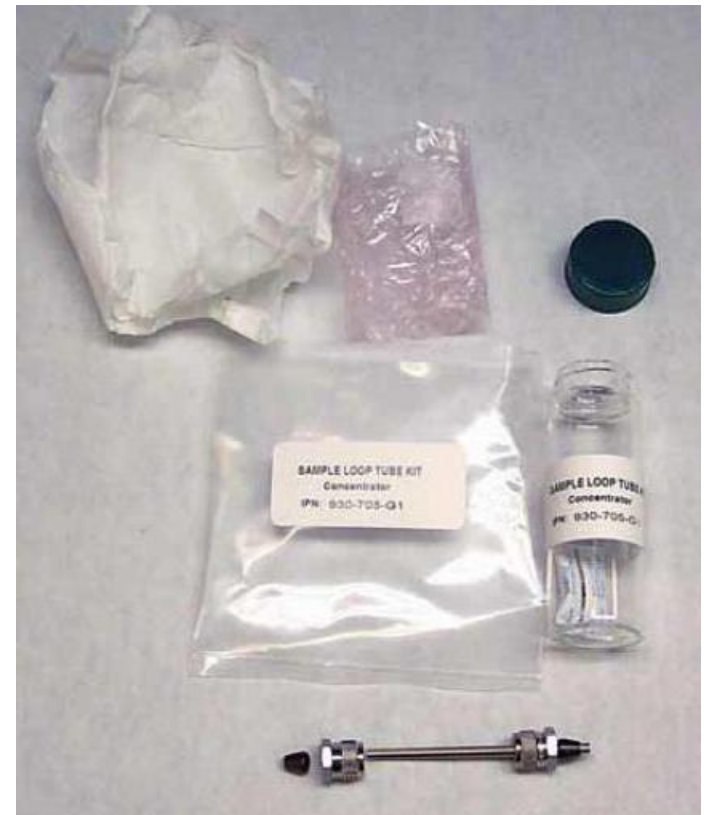


Survey Mode

- Useful Feature – By-passes the GC
- Real-Time Indicator of the Air Quality
- Quick Information for Further Measurements Decisions

Loop Injector Mode

- Analyzes for Higher Level of Gaseous Compounds – ppm levels
- 1 Minute Sampling Time
- 15 Minute Run Time
- ~ 20 Minute Cycle Time



Trap Mode

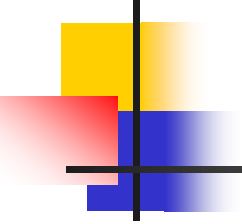
- Analyze for Lower Level Concentrations - ppb
- 2 Minute Sampling Time
- 15 Minute Run Time
- ~20 Minute Run Time



Field Operations

- Strap, Backpack, Cart or ???
- Survey Mode – Scan the Area
- Loop Mode – Contained Sample or Strong Odor
- Trap Mode – Low to No Odor





Operational Upkeep Considerations

- 1/2 Full Time Chemist per Year to Maintain
- Consumables
 - Batteries
 - Portable Gas Canisters
 - Carbon Traps and Loops
- Other Needs
 - Custom Calibration Gas Standards
 - Each compound/peak needs it's own set of standards
 - Maintenance



Limitations

- Less Detection Capability than Laboratory Analysis
- More Volatile Species are not able to detectable (e.g. Light Hydrocarbons, HCN, HCl, HF, NH₃, CO)
- Cannot be operated in an environment where there are potentials for flammability or explosions
- Battery Life
- Needs Proper Routine Maintenance



Field vs Laboratory Instrument

■ Portable Unit

- 20 minute run time
- Limited Compound Separation
- Allows for near real-time sampling decisions
- >5 ppb Level
- Limited Compound Library

■ Laboratory Unit

- Up to >1 hour run time
- Vastly enhanced Compound Separation
- Limited to samples previously taken on site
- Down to 1 ppt
- Extensive Compound Library



Examples of Sampling Sites

Mecca Odor Complaints

Long Beach Odorous Gas Release

Chevron Refinery

LAX Fuel Spill

Torres Martinez Landfill Fire

Café Aroma Odor Complaint

Quemetco Refinery Fire

Tesoro Refinery Fire

LA/Hollywood Area Methane Fire

Ontario Plastics Fire

La Mirada Rail Car Derailment

Lundy-Thaggard Odor Complaint

United Alloy Factory Fires

Universal Studios Fire

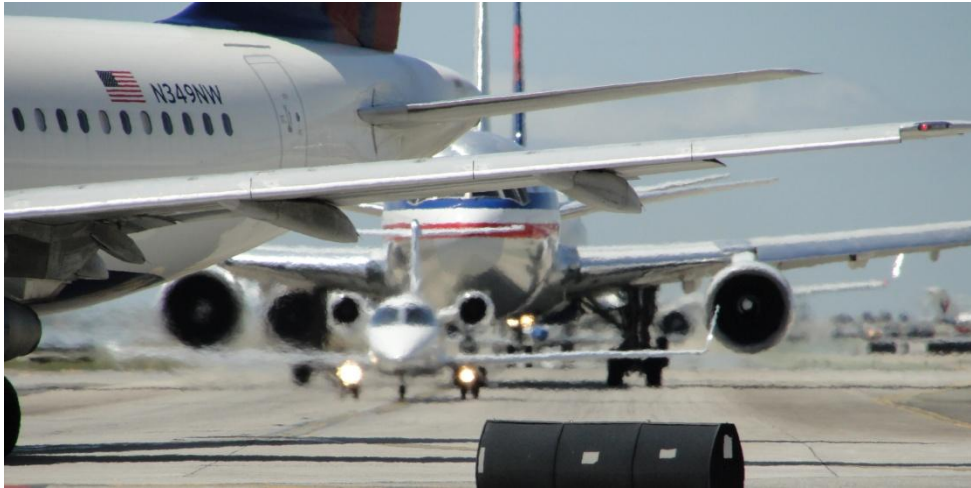
Example Incident: Café Aroma



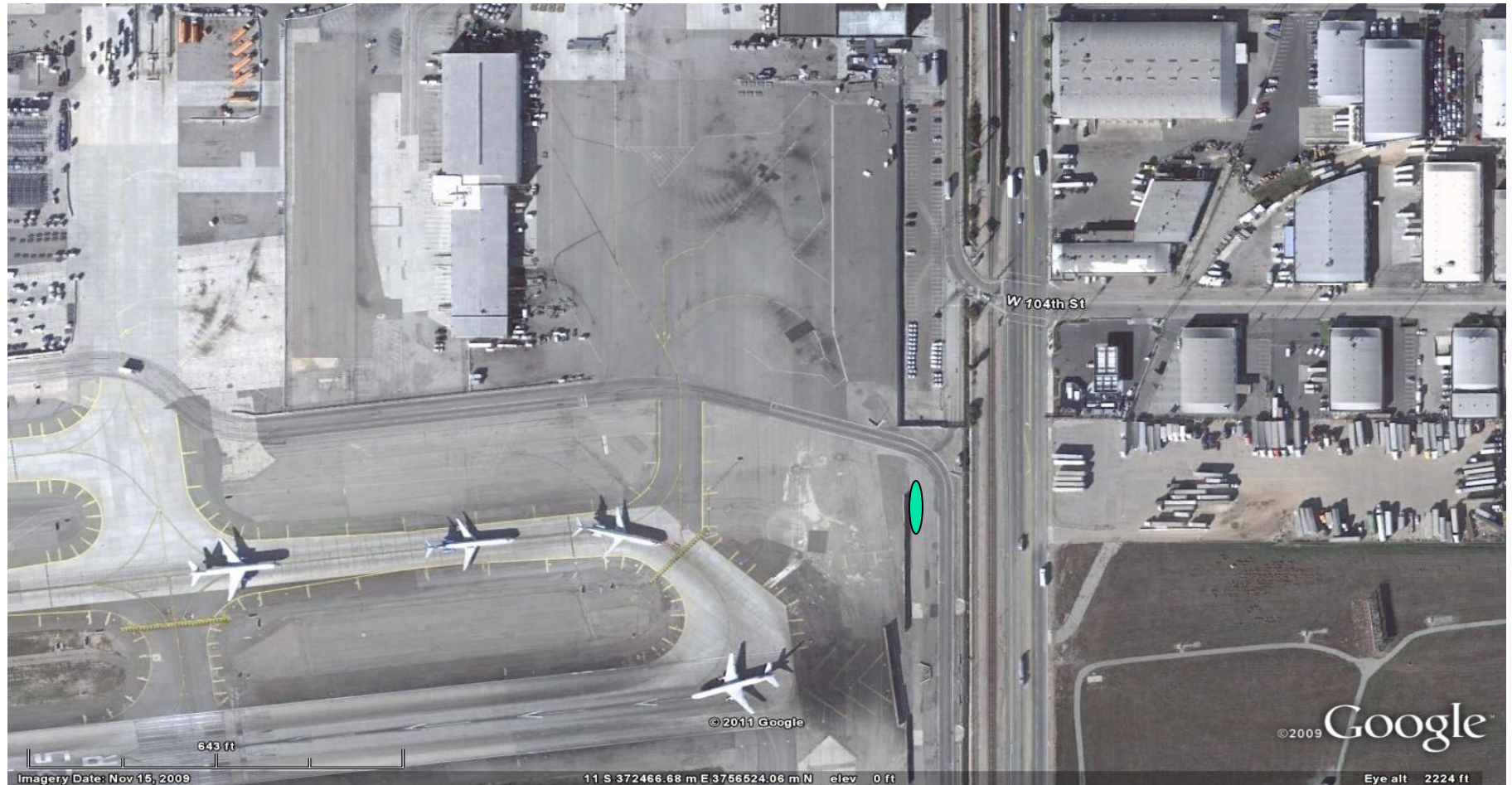
Example Incident: Mecca



LAX Flight Line Study



LAX Flight Line Study



Example Incident: Long Beach



Thank You

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